

# **STC-1 Micro RTU**

## **User Manual (V1.5)**

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|                          |           |
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## **1. Introduction**

### **1.1. Specification**

- **8 Channel Analog Input**
- **8 One Form A Relay output**
- **8 photo-coupler isolated digit input with SOE and Counter**
- **1 RS485 or RS232( 3 wire) ,1 RS485**
- **Modbus RTU**

### **1.2. Parameters**

#### **1.2.1. Analog input**

- ◆ **8 Channel Analog Input**
- ◆ **0~5v or 0~20mA (use jumper to select)**
- ◆ **Input resistance 0~5v 170k $\Omega$  0~20mA 250 $\Omega$**
- ◆ **12bit A/D**
- ◆ **0.2% FS  $\pm$  2digit**

#### **1.2.2. Digit Input**

- ◆ **8 Channel Digit Input**
- ◆ **Photo-coupler Isolated**
- ◆ **Dry contacts**
- ◆ **Commons: all Negative**
- ◆ **DC 12v~48V Input Voltage :**
- ◆ **20k  $\Omega$  Input resistance**
- ◆ **SOE with 1ms resolving**
- ◆ **Pulse Counter with 32BIT**
- ◆ **1KHz Maximum Counter Frequency**

#### **1.2.3. Relay Output**

- ◆ **8 Channel Relay Output**

- ◆ **One Form A (SPST)**
- ◆ **250V/5A AC Contact Capacity**
- ◆ **Relay Contacts Directly connect to IO terminals**

#### **1.2.4. Communication**

- ◆ **1 RS485 or RS232( 3 wire) ,1 RS485**
- ◆ **Modbus RTU**
- ◆ **Max baud rate 38400bps**
- ◆ **Address Setting: DIP SW 1~31**

### **1.3. Operation Condition**

- ◆ **Operating temperature: -20℃ ~ 70℃**
- ◆ **Storage temperature: -40~85℃**
- ◆ **Operating humidity: <85% RH (20±5℃)**
- ◆ **atmospheric: 86~108Kpa**  
**No corrosive gas or heavy dust**
- ◆ **Weight: 450g**
- ◆ **Input/Output M3 screw terminals**
- ◆ **Mounting: Surface or DIN rail**
- ◆ **Size: 145×90×70 mm**
- ◆ **Power Supply: AC 85~265V 40HZ~65HZ**  
**OR DC 24 v OR DC12V**
- ◆ **Power Consumption: < 3W**
- ◆ **Ingress Protection IP30**

## **2. MODBUS**

Detail Ref: <http://www.modbus.org>

The STC-1 Micro RTU Only support a Part Function of Modbus Protocol

Supported Function Code

- 01 READ COIL STATUS
- 02 READ INPUT STATUS
- 03 READ HOLDING REGISTERS
- 04 READ INPUT REGISTERS
- 05 FORCE SINGLE COIL
- 06 PRESET SINGLE REGISTERS
- 24 READ FIFO QUEUE

## 2.1.Coils Status

| Modbus address | function        | description     |
|----------------|-----------------|-----------------|
| 00001          | Relay 1 Control | =1 on    =0 off |
| 00002          | Relay 2 Control | =1 on    =0 off |
| 00003          | Relay 3 Control | =1 on    =0 off |
| 00004          | Relay 4 Control | =1 on    =0 off |
| 00005          | Relay 5 Control | =1 on    =0 off |
| 00006          | Relay 6 Control | =1 on    =0 off |
| 00007          | Relay 7 Control | =1 on    =0 off |
| 00008          | Relay 8 Control | =1 on    =0 off |
|                |                 |                 |
|                |                 |                 |

Use 05 Function FORCE SINGLE COIL to change the Coil Status

## 2.2.Input Status

| Modbus address | function       | description                 |
|----------------|----------------|-----------------------------|
| 10001          | Input 1 Status | =1 power on    =0 power off |
| 10002          | Input 2 Status | =1 power on    =0 power off |

|       |                |                             |
|-------|----------------|-----------------------------|
| 10003 | Input 3 Status | =1 power on    =0 power off |
| 10004 | Input 4 Status | =1 power on    =0 power off |
| 10005 | Input 5 Status | =1 power on    =0 power off |
| 10006 | Input 6 Status | =1 power on    =0 power off |
| 10007 | Input 7 Status | =1 power on    =0 power off |
| 10008 | Input 8 Status | =1 power on    =0 power off |

## 2.3.Holding Register

| Modbus address | function                           | description  |
|----------------|------------------------------------|--|
| 40001          | System 32BIT timer Low 16Bit       | The 32 bit timer is increased every 1ms, it can be modified .This timer is used for SOE time |
| 40002          | System 32BIT timer High 16 bit     |  |
| 40003          | Channel 1 32bit Counter Low 16bit  | Increased every pulse  |
| 40004          | Channel 1 32bit Counter High 16bit | Increased every 65536 pulse  |
| 40005          | Channel 2 32bit Counter Low 16bit  | Increased every pulse  |
| 40006          | Channel 2 32bit Counter High 16bit | Increased every 65536 pulse  |
| 40007          | Channel 3 32bit Counter Low 16bit  | Increased every pulse  |
| 40008          | Channel 3 32bit Counter High 16bit | Increased every 65536 pulse  |
| 40009          | Channel 4 32bit Counter Low 16bit  | Increased every pulse  |
| 40010          | Channel 4 32bit Counter High 16bit | Increased every 65536 pulse  |
| 40011          | Channel 5 32bit Counter Low 16bit  | Increased every pulse  |

|              |                                       |                                |
|--------------|---------------------------------------|--------------------------------|
| 40012        | Channel 5 32bit Counter<br>High 16bit | Increased every 65536<br>pulse |
| 40013        | Channel 6 32bit Counter<br>Low 16bit  | Increased every pulse          |
| 40014        | Channel 6 32bit Counter<br>High 16bit | Increased every 65536<br>pulse |
| 40015        | Channel 7 32bit Counter<br>Low 16bit  | Increased every pulse          |
| 40016        | Channel 7 32bit Counter<br>High 16bit | Increased every 65536<br>pulse |
| 40017        | Channel 8 32bit Counter<br>Low 16bit  | Increased every pulse          |
| 40018        | Channel 8 32bit Counter<br>High 16bit | Increased every 65536<br>pulse |
| 40019        | SIO1 delay time Set                   | Unit: 1ms                      |
| 40020        | SIO2 delay time Set                   | Unit: 1ms                      |
| 40021        | SIO1 Set                              |                                |
| 40022        | SIO2 Set                              |                                |
| 40023 ~40041 | reserved                              |                                |
| 40042        | Frequency Measure Gate<br>Time        | Unit: 1ms                      |
|              |                                       |                                |
|              |                                       |                                |
|              |                                       |                                |
|              |                                       |                                |
|              |                                       |                                |
|              |                                       |                                |
|              |                                       |                                |
|              |                                       |                                |

Use 06 Function PRESET SINGLE REGISTERS to modify the value of Holding Register. The Value of Holding Register is Non-Volatile .

## 2.4. Input Register

| Modbus address | function                        | description                                    |
|----------------|---------------------------------|--|
| 30001          | Analog channle1 input value     | 16 bit unsigned 5000 is full scale 5V or 20mA  |
| 30002          | Analog channle2 input value     | 16 bit unsigned 5000 is full scale 5V or 20mA  |
| 30003          | Analog channle3 input value     | 16 bit unsigned 5000 is full scale 5V or 20mA  |
| 30004          | Analog channle4 input value     | 16 bit unsigned 5000 is full scale 5V or 20mA  |
| 30005          | Analog channle5 input value     | 16 bit unsigned 5000 is full scale 5V or 20mA  |
| 30006          | Analog channle6 input value     | 16 bit unsigned 5000 is full scale 5V or 20mA  |
| 30007          | Analog channle7 input value     | 16 bit unsigned 5000 is full scale 5V or 20mA  |
| 30008          | Analog channle8 input value     | 16 bit unsigned 5000 is full scale 5V or 20mA  |
| 30009          | reserved                        |  |
| 30010          | reserved                        |  |
| 30011          | Digit input channel 1 frequency | 16bit unsigned<br>(the pulse in the gate time) |
| 30012          | Digit input channel 2 frequency | 16bit unsigned<br>(the pulse in the gate time) |
| 30013          | Digit input channel 3 frequency | 16bit unsigned<br>(the pulse in the gate time) |
| 30014          | Digit input channel 4 frequency | 16bit unsigned<br>(the pulse in the gate time) |
| 30015          | Digit input channel 5 frequency | 16bit unsigned<br>(the pulse in the gate time) |
| 30016          | Digit input channel 6           | 16bit unsigned                                 |



|       |                                 |  |
|-------|---------------------------------|--|
|       | frequency                       | (the pulse in the gate time)                   |
| 30017 | Digit input channel 7 frequency | 16bit unsigned<br>(the pulse in the gate time) |
| 30018 | Digit input channel 8 frequency | 16bit unsigned<br>(the pulse in the gate time) |
|       |                                 |  |
|       |                                 |  |
|       |                                 |  |
|       |                                 |  |
|       |                                 |  |

## 2.5. FIFO

The FIFO is used for SOE

### READ

XX 18 00 00 CRC (xx Modbus Address)

### Response

XX 18 By Te Fi FO data CRC

By Te is byte counter of followed response

Fi FO is the counter of followed fifo

Data is the content of fifo

Data is consist of 8 byte,

Byte0(H) byte1(L) is one 16BIT integer ,the content is SOE action point

= 0 is the first digit input changed =2 is the third digit input changed

Byte2(H),Byte3(L) is one 16BIT integer, the content is SOE attribute,

=0 is the input act as 1-→0

=1 is the input act as 0-→1

Byte4(H),Byte5, Byte6 , Byte7 (L) is one 32 bit integer, the act time

## 3. Install

### 3.1. Mounting

#### 3.1.1. Surface Mounting

Attach to the Mounting surface by 4 M4 screw .

#### 3.1.2. DIN rail

Fasten to DIN rail by two red clips.

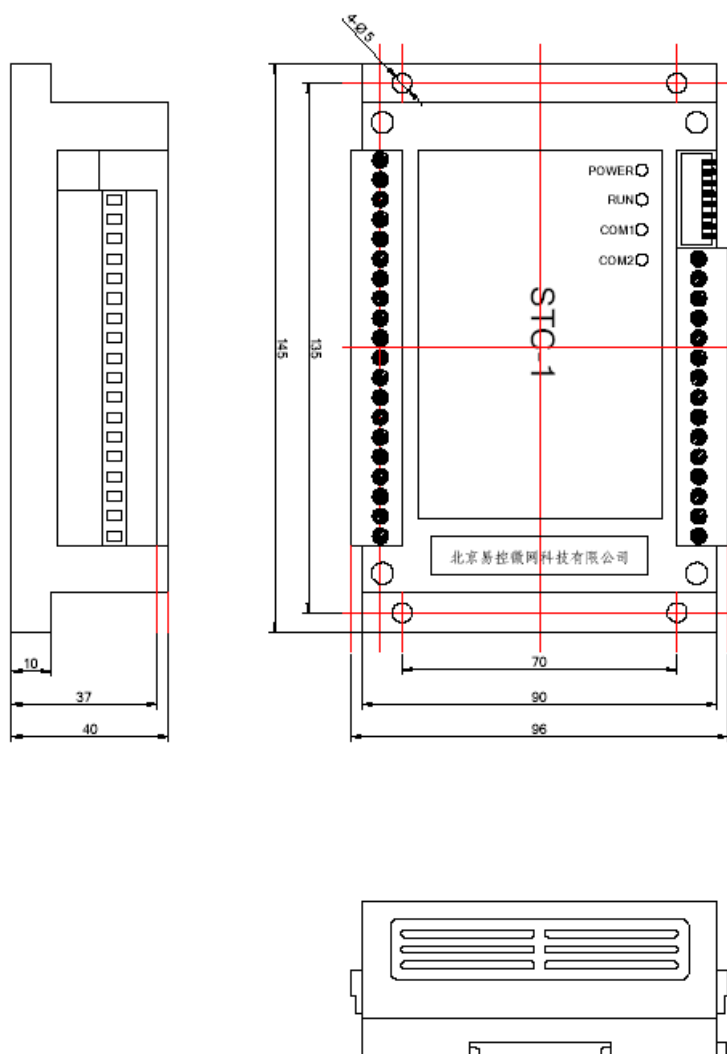


Figure 1

## 3.2. Connect Terminals

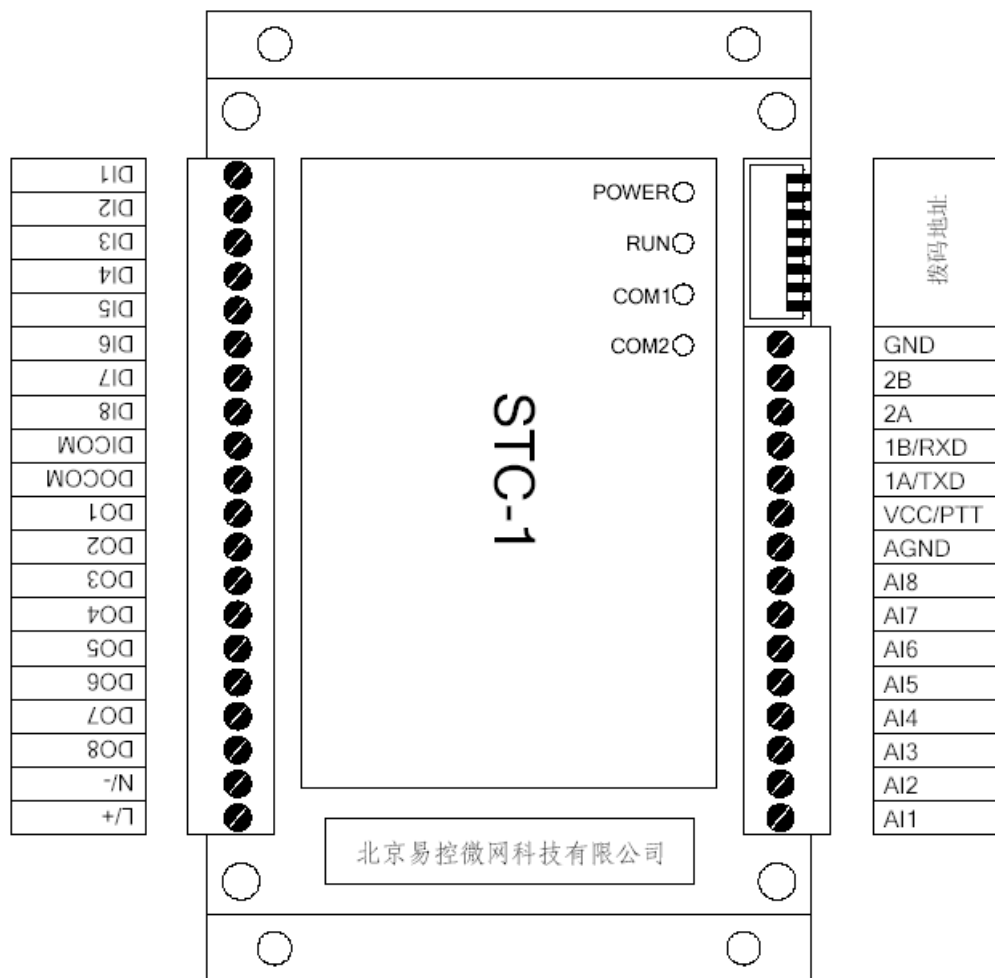
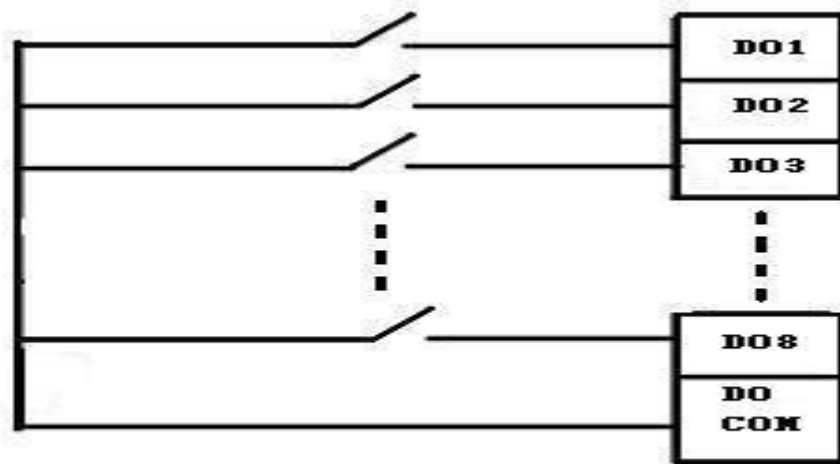


Figure 2

### 3.2.1. Relay output

The relay output connection is according to your usage. There are 8 relays in the device. As figure 2.

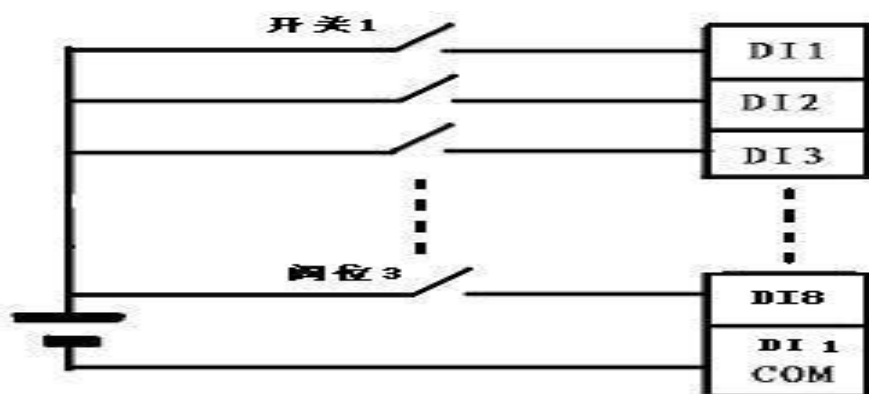
The inner contact is show as below



The contacts directly connect to the terminals.

### 3.2.2. Digit Input

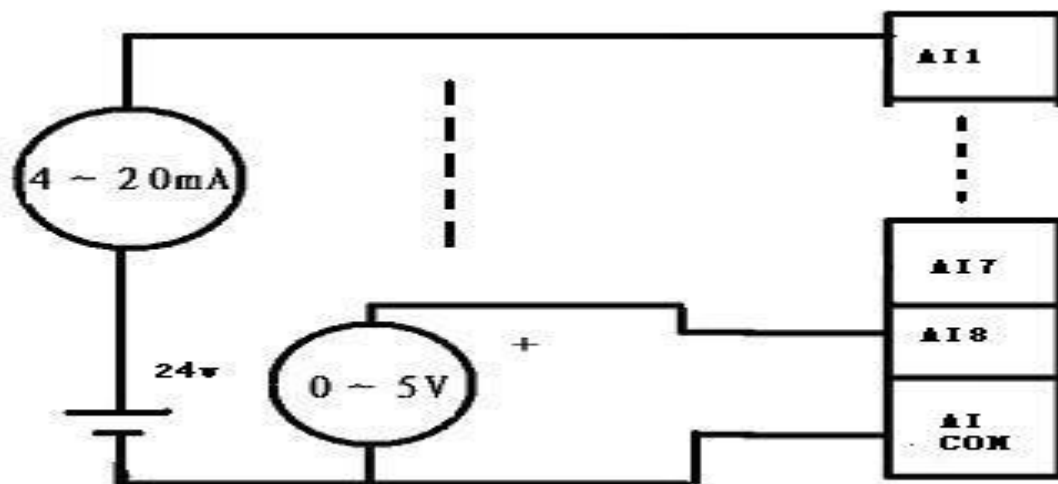
The Digit Input can use as below



### 3.2.3. Analog Input

Analog input can use 0~5v or 0~20mA, Select by inner jumper, it can be used as below.

Use 0~20ma or 0~5v must be determined on sign the contract.



### 3.2.4. Power

The device power supply is AC 85V~265V , DC110~220V . A alternative is DC24V 10%

Connect L N when use AC power

Connect to + - when use DC Power.

When use DC 24V must be determined on sign the contract.

### 3.2.5. RS232 RS485

The device have tow Serial Port

One(SIO1) can be configure as RS232 or RS485 , must be determined on sign the contract.. One(SIO2) is only RS485

SIO1 When use as RS232 ,only three wire **GND,TXD,RXD** ,as RS485 only two wire **2A 2B**.

The RS485 Can drive 500m shield twist pair cable.

All the SIO support modbus RTU Protocol.

### 3.2.6. MODBUS Address

Modbus Address can be set by DIP SW , when a SW is on ,the corresponding bit is 0, or is 1. The sw marked 1 is LSB ,only 5 SW is

available. The address can be 1~31.

### 3.2.7. LED

The device with four LEDS, named **POWER,RUN,COM1,COM2**

**Power** , Green , Lightened when Power on

**RUN** Green Flashed on working properly

**COM1** Orange Flashed on SIO1 Communication

**COM2** Orange Flashed on SIO2 Communication